

The contribution of the *Aurora Australis* “THIRST” voyage (Heard Island, Austral winter 1993) to the cytogenetics of Antarctic fish

by

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Following the signing of the Arrangement for Scientific Cooperation in relation to Antarctica between Italy and Australia in Canberra in 1992, a cytogenetic study on fish fauna of Heard Island Plateau was included in the 1993 Australian Antarctic and Subantarctic Programme (Pisano, 1993). The study was carried out during the winter ichthyological survey on the shelf around Heard Island, on board the *Aurora Australis* (THIRST voyage - Third Heard Island Research Survey Trip, cruise leader R. Williams). During the cruise, the notothenioids *Champsocephalus gunnari* Lönnberg 1905, *Channichthys rhinoceratus* Richardson 1844, *Dissostichus eleginoides* Smitt 1898, *Lepidonotothen mizops* (Günther 1880), *L. squamifrons* (Günther 1880), *Gobionotothen acuta* (Günther 1880) were collected. Some non-notothenioid fish species (Congiopodidae, Rajidae) were also made available for cytogenetic studies. The sampling was a significant source of material for intensive cytogenetic analyses that were performed in the subsequent years. The collaboration with French cytogenetics researchers, mainly at the Museum of Natural History in Paris, allowed the integration of data from the surveys in the Kerguelen-Heard region performed during the French campaigns ICHTYO/GENET (1984) and MD42/SIBEX (1985) (Doussau de Bazignan and Ozouf-Costaz, 1985; Ozouf-Costaz and Doussau de Bazignan, 1987). Moreover the campaign, in addition to frozen cell suspensions for chromosomal analyses, provided the genomic DNA used to prepare the first specific probes for fluorescence *in situ* hybridization (FISH) in notothenioids. The THIRST survey largely contributed to the activity of the European Science Foundation Network “Fishes of the Antarctic Ocean”, launched in 1993 (di Prisco *et al.*, 1998). Among the most relevant results, the study on *C. gunnari* from Heard Island provided the opportunity to review the chromosomal information on the family Channichthyidae (Pisano *et al.*, 1997). The first successful FISH in the same species (Ozouf-Costaz *et al.*, 1996) opened the way to comparative ribosomal gene mapping in channichthyids (Mazzei *et al.*, 2004) and in various phylogenetic lineages of the suborder (Pisano and Ozouf-Costaz, 2003; Pisano and Ghigliotti, 2009). Within the Nototheniidae, *D. eleginoides* from THIRST allowed the cytogenetic comparison of specimens from the Indian Sector and the Atlantic Sector (ICEFISH 2004 cruise), and between *D. eleginoides* and *D. mawsoni* Norman 1937. This latter analysis highlighted genomic differences between the two co-generic species, related to the chromosomal organization of the ribosomal

genes, of potential interest in toothfish fishery management (Ghigliotti *et al.*, 2007). Some samples from THIRST, such as the nototheniid *L. squamifrons* and the congiopodid *Zanclus cornutus spinifer* Günther 1880, are still used for comparative analysis with samples from other campaigns, including the recent POKER.

As an additional relevant faunistic output, the THIRST cruise contributed to our knowledge of the parasitic fauna infecting fish species off Heard Island, thanks to the collaboration with the specialists of the Polish Academy of Science of Warsaw (Wojciechowska *et al.* 1995; Zdzitowiecki and Pisano, 1996a, 1996b).

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